

GVT-Based Ground Flutter Test without Wind Tunnel, Phase II

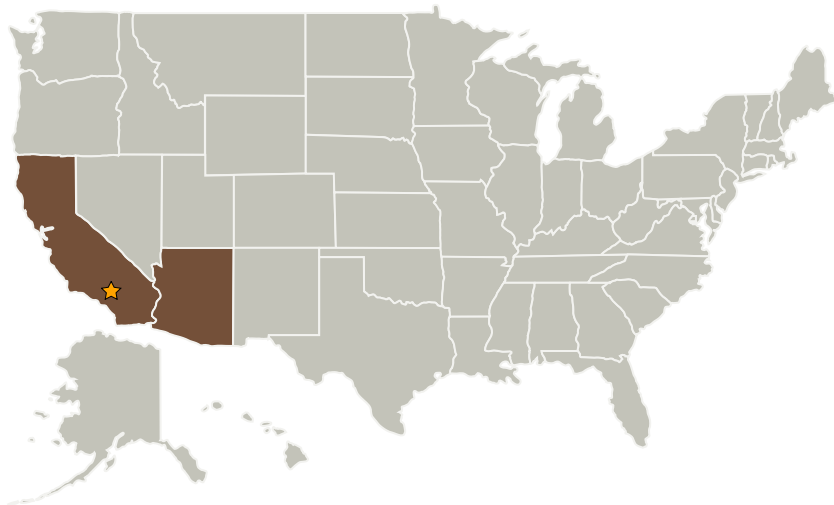
Completed Technology Project (2009 - 2011)



Project Introduction

ZONA Technology, Inc (ZONA) and Arizona State University (ASU) propose a R&D effort to further develop the ground flutter testing system in place of a wind tunnel (WT), called the Dry Wind Tunnel (DWT) system. The DWT system consists of a ground vibration test (GVT) hardware system and a real-time unsteady aerodynamic force generation software system developed from an aerodynamic reduced order model (ROM). The DWT system can serve as a replacement or complimentary means for flutter/ASE instability testing to a WT. Our Phase I effort has successfully demonstrated the validity of the DWT concept. That is, DWT testing can truly simulate in real time the unsteady aerodynamics through a GVT hardware system, namely the shakers and sensors. Merits of a DWT are many: It can use real full-size aircraft/wing structure including inherent structural nonlinearity and flight controller in-the loop, instead of a flutter model for WT, hence a cost/time effective test system. It can be carried out with a GVT setup, and because of the simulated aerodynamics the DWT measured data is wall-interference free. The DWT system can be applicable to flutter envelope expansion and flying quality programs of military and civil transport as well as general aviation aircraft.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

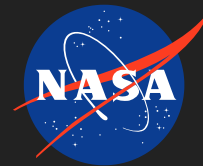
Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
ZONA Technology, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Scottsdale, Arizona

Primary U.S. Work Locations

Arizona	California
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Project Transitions

**June 2009:** Project Start**September 2011:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.2 Structures
 - └ TX12.2.4 Tests, Tools and Methods